MYCOLOGIA

VOL. IX NOVEMBER, 1917 NO. 6

NOTES ON NEW OR RARE MYXOMYCETES

W. C. STURGIS

(WITH PLATES 14 AND 15)

During the past few years a number of interesting species of Myxomycetes have come to my attention. They are principally the result of my own collecting, but in some cases they are gatherings submitted to me through the courtesy of other collectors. In the former case most of the gatherings were made in Colorado, and add considerably to the already rich list of Myxomycetes recorded from that locality. As usual, I am greatly indebted to the expert judgment of Miss G. Lister and Professor T. H. Macbride, to whom have been submitted the more critical specimens included in the following list.

Physarum melanospermum sp. nov. *Pl. 14, f. 1–3.* Plasmodium? Sporangia stalked, gregarious or scattered, turbinate or discoid, usually umbilicate above, 0.4–0.7 mm. in diameter, grayish-white, rugose; sporangium-wall membranous, roughened above with abundant deposits of white lime, darker and reddish-brown where it merges into the stalk. Stalk stout, black, furrowed, expanding below, about 0.2 mm. long and 0.1 mm. thick. Capillitium consisting of abundant rounded, elongate or angular, white lime-knots, connected by many delicate hyaline threads. Spores dark-purplish-brown, closely spinulose, showing a paler and smoother germinal area, 12.5–16 μ in diameter.

Habitat: On dead twigs and leaves of *Clematis, Symphoricarpos,* etc., Aurora, Colorado (Bethel), Colorado Springs, Colorado (Sturgis).

This species has occurred abundantly in successive years on fallen refuse under shrubby thickets. It somewhat resembles

[MYCOLOGIA for September (9: 257–322) was issued September 24, 1917.]

small forms of *Badhamia macrocarpa,* and might be mistaken at first sight for *B. orbiculata;* but the character of the capillitium is distinctly that of *Physarum.* From *P. compressum* and *P. connatum,* its nearest allies, it may be distinguished by the shape and habit of the sporangia and their small size, as well as by the larger spores with the wall of uneven thickness.

Physarum lilacinum Sturgis & Bilgram sp. nov. Plasmodium? Sporangia gregarious, stalked, globose, erect, pale-lilac to pale-Indian-red[1] in color, 0.5 mm. in diameter; sporangium-wall membranous, beset with rounded masses of lilac or reddish lime. Stalk erect, broad-based, tapering upward, calcareous, furrowed, paler than the sporangium or concolorous, 0.7–0.9 mm. long, about 0.1 mm. thick. Columella conical or columnar. Capillitium delicate, rigid, persistent; lime-knots small, rounded, composed of large, pale lilac, or reddish, spherical granules. Spores pale-brown, almost smooth, 8–9 μ in diameter.

Habitat: On dead wood and moss. Fairmount Park, Philadelphia, Pa. (H. Bilgram).

This peculiar form occurred in considerable abundance in September, 1910, and again two years later at a distance of twenty miles from the original locality. Like *P. citrinum, P. murinum* and others of this group, it resembles *P. globuliferum* very closely, except in color. Whether this affords sufficient grounds of distinction may be questionable, but since it is at present accepted as such, it seems advisable to publish the above as a distinct species rather than as a colored variety of *P. globuliferum.* From *P. pulcherrimum* it differs not only in color, but in the shape of the columella and in the color of the spores.

PHYSARUM JAVANICUM Racib. This species occurs in a large collection of Myxomycetes made in Florida by Professor Roland Thaxter in the autumn of 1897. The scattered, stalked, white sporangia, obconic in shape, deeply umbilicate above; the subulate, spirally-twisted, sulcate stalks encrusted with whitish lime; the capillitium of large, angular or rounded, white lime-knots, with stiff, rod-like attachments to the wall, seemed to be characters applicable only to this species. Specimens were submitted to Miss Lister, who confirmed the diagnosis. This is the first record of the occurrence of *P. javanicum* outside of Java.

[1] The colors are those designated as "purple madder" and "Indian red" of Winsor and Newton's "Specimen Tints."

PHYSARUM SULPHUREUM Albert. & Schw. Syn. *P. variabile* Rex. During the summer of 1914 a species of *Physarum* occurred abundantly on dead twigs and leaves in a swamp in the Wet Mountain Valley, Colorado. Some of the gatherings showed the greenish or bronze-yellow, globose or somewhat clavate sporangia, and the reddish-brown, densely calcareous stalks of *P. variabile*. Others agreed perfectly with the original description and figure of *P. sulphureum*. This led to a careful study of the two, with the result that it proved impossible to discover any essential differences between them. The points of difference noted by the Listers (Mon. Mycet., Ed. 2, pp. 46–47) emphasize the marked similarity. Macbride (N. A. Slime-Moulds, pp. 39–40) gives an admirable description of *P. variabile*—though placing it among the forms with non-calcareous stalks—but makes no mention of *P. sulphureum*. In a recent letter, Miss Lister states that in her opinion the Colorado gatherings prove the identity of the two so-called species, and at the same time she calls my attention to a minor point of similarity between them in the form of small, greenish, spherical bodies which become apparent in the wall and lime-knots, after the lime is dissolved out with acid. In the Colorado material sessile and plasmodiocarp forms frequently occur.

PHYSARUM CARNEUM List. and Stur. This rare species, first described from material collected near Colorado Springs in 1908, was found again in the Wet Mountain Valley, Colorado, in August, 1914. It is satisfactory to note that this second gathering, occurring many miles from the original locality, wholly confirms the original diagnosis in the tawny sporangia borne on delicate, buff, limeless stalks; large, branching, white lime-knots; and bright-brownish-purple, spinulose spores, paler and smoother on one side. The original gathering was on decayed wood, the later one on a dry Basidiomycetous fungus.

PHYSARUM FULVUM (Macbr.) List. This species has heretofore been represented with certainty by only the single gathering made by Mr. Bethel, of Denver, in Loveland Pass, Colorado, in 1896. This occurred on living willow at the edge of melting snow. In August, 1915, I found it growing in limited quantity on dead coniferous wood near Lake Eldora, Colorado. Notwith-

standing an exceptionally dry summer, the specimen was badly weathered, indicating that it is a typically spring species. It is, however, perfectly characteristic in the membranous hypothallus and stalk; persistent capillitium of fine, branching threads with large, scattered, yellow lime-knots; and dark, spinulose spores, 10.5–11 μ in diameter.

CRATERIUM AUREUM (Schum.) Rost. This species is recorded here merely as an addition to previously published lists of Colorado Myxomycetes. It occurred in considerable abundance on dead herbaceous refuse in the Wet Mountain Valley and on dead twigs on Cheyenne Mountain in August, 1914. Both gatherings are of the form with globose, golden-yellow sporangia, cartilaginous below; orange stalks rising from a membranous hypothallus; dense capillitium, the nearly white lime-knots often merging into a central mass; spores 8–9.5 μ in diameter. In this form it is hardly distinguishable from *Physarum citrinellum* Pk.

CRATERIUM PARAGUAYENSE (Speg.) List. Recorded hitherto in the United States only from Louisiana (*Craterium rubescens* Rex), this species occurs in fine condition in a large collection of Myxomycetes made by Professor Thaxter in Florida in 1897. The specimens were found on dead leaves at Palm Beach and are typical in every respect.

DIDERMA TREVELYANI (Grev.) Fries. The normal form of this species is common in Colorado. In September, 1915, a plasmodiocarpic form was found in company with the normal form on dead leaves on Cheyenne Mountain, Colorado. The plasmodiocarps are of very variable form and size and of a uniform chocolate color without paler lines of dehiscence. In other respects they are quite typical.

DIDERMA RUGOSUM (Rex) Macbr. Fine specimens of this rather uncommon species were collected in Florida by Professor Thaxter in 1897. It is typical in every respect, except that the spores measure 11.5–14.5 μ in diameter, a fact of interest in view of the close relationship of this species to *D. radiatum*.

DIDERMA SIMPLEX (Schroet.) List. Miss Lister reports this species from New Jersey (Monog. Mycet., p. 108); Mr. Hugo Bilgram has collected it near Philadelphia. A very fine gathering was made by Professor Thaxter at Cranberry, N. C., in

August, 1896. The latter consists of densely crowded sporangia of a tawny color nearly approaching pale-raw-umber. The wall is somewhat cartilaginous and the spores are rather larger than in typical *C. simplex,* but the general characteristics are those of that species. Many of the sporangia show a peculiar large, hollow columella, agreeing in this particular with the specimen from Bartlett Mountain, N. H., referred to in Lister's Monograph, Ed. 2, p. 108. If this latter specimen is correctly referred to *D. simplex,* that species would appear to be subject to considerable variations in color and to be fairly widely distributed throughout the United States.

DIACHAEA CYLINDRICA Bilgr. This species, hitherto recorded only from Philadelphia, occurs in a collection of Myxomycetes made by Professor Thaxter at Intervale, N. H., in September, 1901. In its densly crowded habit it resembles *D. caespitosa;* the sporangia are also less markedly cylindric than in the type; but on the whole the specimen is evidently a form of *D. cylindrica* in which the almost confluent character of the sporangia is correlated with a remarkably indefinite and ill-developed columella.

Didymium fulvum sp. nov. *Pl. 14, f. 4–6.* Sporangia gregarious, sessile, elongate or forming curved plasmodiocarps, sometimes confluent, rarely subglobose, concave beneath, pale-raw-umber in color, 0.5–0.8 mm. in diameter, occasionally seated on a concolorous, membranous, lime-encrusted hypothallus which may form pseudo-stalks; sporangium-wall membranous, stained with yellow blotches, thickly sprinkled with clusters of large acicular crystals of pale-yellowish lime. Columella very much flattened or obsolete. Capillitium an abundant network of delicate, almost straight or flexuose, pale-purple or nearly hyaline threads, frequently with dark, calyciform thickenings as in *Mucilago,* and occasionally showing fusiform, crystalline blisters. Spores dark-purplish-brown, coarsely tuberculate, the tubercles usually arranged in curved lines, paler and smoother on one side, 12.5 to 14.5 μ in diameter.

HABITAT: On dead twigs, leaves and other refuse. Wet Mountain Valley, Colorado, August, 1913.

This peculiar form has been found only once, but in considerable abundance. At first sight it bears a very close resemblance to some form of *Lepidoderma Carestianum,* but notwithstanding

the variable character of that species it could hardly be made to include a form with stellate lime-crystals. The capillitium and spores resemble those of *Mucilago,* but it is evidently removed from that genus by its habit and structure. Among the species of *Didymium,* the only one approaching it in color appears to be *D. leoninum,* but otherwise the two forms have no features in common. On the whole, the present species appears to stand by itself in the genus *Didymium,* but with decided leanings toward *Lepidoderma,* and even toward *Mucilago.*

ECHINOSTELIUM MINUTUM DeBary. This species occurred on dead herbaceous stems in a laboratory culture in Professor Thaxter's laboratory at Cambridge, Mass., in December, 1914. The material came from Waverly, Mass. Although this appears to be the first record of its appearance in America, the species may not be uncommon. Its small size and its resemblance to a *Mucor* or some Hyphomycetous fungus might easily cause it to be overlooked.[2]

AMAUROCHAETE FULIGINOSA (Sow.) Macbr. This species has been reported hitherto in the United States only from New England, New York, Carolina, and Ohio. In 1909, Mr. Bethel collected it on dead wood of *Pinus Murrayana* at Tolland, Colorado, thus extending its range westward.

In the Cryptogamic Herbarium of Harvard University there is a specimen from Professor Macbride marked "*Amaurochaete cribrosa* (Fr.)," collected on Mt. Rainier, Washington. It is very different from *A. fuliginosa,* consisting of a round, determinate, sooty patch of ill-developed sporangia showing weak, indefinite, membranous columellae and a capillitium composed of very delicate, more or less arcuate threads connecting angular or elongated membranous expansions, the whole forming a very open and imperfect net with many free ends. The spores are rather dark, minutely spinulose, paler and smoother on one side, and measure 12–15 μ in diameter. They are slightly larger and darker than those of *A. fuliginosa.* A precisely similar form was collected by Mr. A. P. D. Piguet at Sharon, Mass., in May, 1910, on bark of *Pinus Strobus.*

[2] Since writing the above, a gathering of *Echinostelium* has been reported to me by Mr. Bilgram, of Philadelphia, who found it growing in the open, in company with *Tilmadoche.*

That this is the "*Lachnobolus cribrosus*" of Fries appears to me fairly certain, and with this view both Miss Lister and Professor Macbride agree. The combination, *Amaurochaete cribrosa* (Fr.) appears never to have been published.

CRIBRARIA TENELLA Schrad. Specimens of this common species were found in December, 1898, at Palm Beach, Florida, by Professor Thaxter. They are noteworthy as being the "very small neat variety" noted by Miss Lister (Mon. Mycet., Ed. 2, p. 181) as occurring in this country and in Dominica. The variety bears a very close resemblance, except in color, to *C. microcarpa*.

CRIBRARIA VIOLACEA Rex. A rather abnormal form of this species was found by Professor Thaxter on pig-dung and on wood at Eustis and Cocoanut Grove, Florida, in September and November, 1897. In both gatherings the apical portion of the sporangia consists of large polygonal, membranous fragments, connected by many very delicate threads. Only occasionally are any thickened nodes apparent.

CRIBRARIA PURPUREA Schrad. This rare species occurred in considerable abundance on coniferous wood in the Wet Mountain Valley, Colorado, in August, 1913. It was collected as *Dictydium*, its true character appearing only upon microscopic examination. From *C. elegans* Berk. & Curt., it differs in its larger size, the surface-net with variously expanded nodes, and the minutely spinulose spores. These characters, however, are not altogether distinctive; the present gathering shows a certain blending of the two, and it is not unlikely that further gatherings of *C. elegans* may show that it is only a small form of *C. purpurea*.

Enteridium minutum sp. nov. *Pl. 15.* Plasmodium? Aethalia rounded or elongate, pulvinate, pale umber in color, seated on a broad membranous base, 1.5–2 mm. in diameter; wall wrinkled and usually marked with small, scattered pits, pale-yellow, membranous. Walls of the component sporangia membranous, minutely roughened, perforated with round openings, the margins of which show many free threads; or reduced to irregular, anastomosing strands arising from the base of the aethalium, with membranous or net-like expansions at the angles and with many delicate, free, pointed ends. Spores pale-yellow, usually united in twos or threes and ovoid or flattened on one side; when free, globose, very minutely spinulose, 9.5–10.5 μ in diameter.

HABITAT: On dead coniferous wood. Eldora Lake, Colorado, August, 1915.

It is with great hesitation that I describe this form as a new species. Miss Lister states, in correspondence, that the aethalia of *Enteridium olivaceum* are frequently very small, but the spores of that species are always olive in the mass, in sharp contrast with the yellow color seen in the form under discussion; apparently also, they are always united in large clusters. The inner structure of the aethalia of *E. minutum* is in some cases almost exactly that of typical *Enteridium;* in others it more nearly resembles the capillitium of *Liceopsis;* yet the aethalia show every indication of having developed normally to maturity. On the whole, it has seemed best to record this form now, in the event of further gatherings being made which may throw additional light upon it.

HEMITRICHIA LEIOCARPA (Cke.) List. About two years ago Mr. Bilgram of Philadelphia sent me a specimen which bore a certain resemblance to a long-stalked form of *Arcyria cinerea.* Upon closer examination, however, it proved to be *Hemitrichia leiocarpa.* It is in all respects typical and appears to differ quite markedly from *H. clavata* in color and in the small size of the spores. An interesting feature of the gathering, to which Miss Lister called my attention, is seen in the right-handed spirals on the capillitial threads; while in *H. clavata* the spirals are left-handed. Miss Lister further states, in correspondence, that in the type specimen of *H. leiocarpa* from Maine, as well as in a specimen collected by Professor Balfour in the Edinburgh Botanic Gardens, the spirals are right-handed, while in the type of *H. Varneyi* Rex, which is supposed to be identical with *H. leiocarpa,* the spirals are left-handed, as in *H. clavata,* and she suggests that the direction of the spirals may be diagnostic. In my opinion this is probably not the case. It is not unusual in the case of *Arcyria globosa,* for example, to find specimens in which the minute spines on the threads are arranged in a right-handed spiral, though normally the arrangement is left-handed, as noted by Miss Lister (Mon. Mycet. Ed. 2, p. 238). Such is the case in the specimen distributed by Ellis & Everhart in N. Am. Fungi *1116.* If the spirals in *H. leiocarpa* may be either right-handed

or left-handed, the species has now been recorded from Maine, Kansas, Pennsylvania, Poland and Scotland.

ARCYRIA OERSTEDTII Rost. A single large gathering of this species was made in the Wet Mountain Valley, Colorado, in August, 1914. It is perfectly characteristic, though lacking the persistent remnants of the sporangium-wall. This is not a diagnostic feature. The species is recorded from New York, Pennsylvania, and Kansas. The present record extends the range westward, making it probable that it is not uncommon throughout the United States.

ARCYRIA OCCIDENTALIS (Macbr.) List. This rare form was found at Oquossoc, Maine, growing in company with *Trichia contorta* on poplar bark, in May, 1916. The gathering is faded and weathered, indicating that the species should be looked for early in the spring or possibly in the late autumn. The sporangia are either separate or crowded; in the former case they show fairly long stalks. The persistent portion of the wall splits downward in rounded lobes. The minutely spinulose capillitium is marked besides with a single row of small blunt teeth, arranged in a very open spiral. Though rare, the species appears to be widely distributed.

PERICHAENA CORTICALIS (Batsch) Rost. var. *liceoides* (Rost.) List. In looking over a collection of Myxomycetes made by Professor Thaxter in Florida in 1897, I came across a peculiar form growing on cow-dung, which, from its minute size, its delicate, membranous structure, and the complete absence of capillitium, I took to be an undescribed species of *Licea*. Specimens were submitted to Miss Lister, however, who, in reply, referred the gathering as above, stating further that in a series of specimens, all on dung, the capillitium was either absent, or in the form of irregular elaters, or even combined into a net. In the Florida specimens the sporangia are globose or pulvinate, sessile, yellow-brown, 0.14–0.29 mm. in diameter; the wall is pale-yellow, membranous, with minute granular thickenings; capillitium wanting; spores yellow, thick-walled, distinctly spinulose, 11.5–13.5 μ in diameter. This is the first recorded gathering in America.

DIANEMA HARVEYI Rex. This species has hitherto been repre-

sented in America only by Harvey's original gathering from Orono, Maine. It is therefore satisfactory to be able to record another locality. In August, 1913, it was collected in small quantity in the Wet Mountain Valley, Colorado. The gathering corresponds in every particular with the original description.

DIANEMA CORTICATUM List. A small gathering of this interesting species was made at Lake Eldora, Colorado, in August. 1915. The salmon-pink plasmodium occurred on coniferous wood and was seen to mature into subglobose or elongated, crowded sporangia, often longitudinally wrinkled and of a reddish-brown or chestnut color. The capillitial threads are scanty, delicate, straight, rarely branching, often thickened longitudinally or in a bead-like manner, rarely showing traces of spiral markings. The spores, usually united in clusters of 2–5, are, in the mass, precisely the color of those of *Lycogala epidendrum*. This is the first record of this species in the United States. Miss Lister writes me that it was collected by Professor J. W. Eastham near Quebec in September, 1913. In gross appearance and in the character of the sporangium-wall, *Dianema corticatum* recalls the genus *Perichaena*. The clustered, yellow spores are similar to those of *Enteridium*. The capillitium exhibits the features of both *Prototrichia* and *Dianema*. As Miss Lister points out, it is undoubtedly a transition form connecting the two latter genera.

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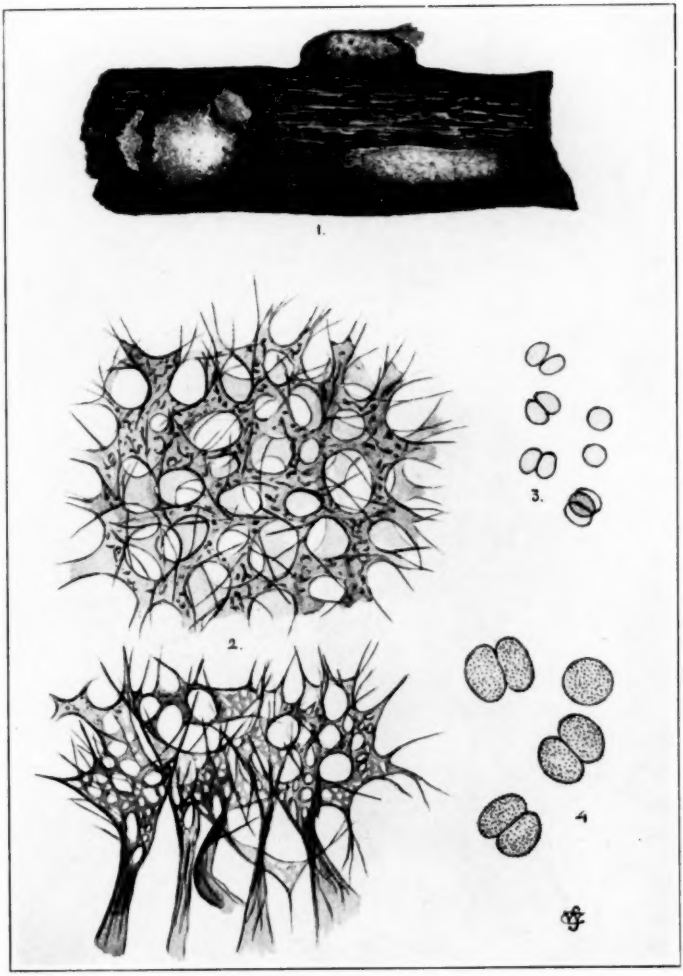
EXPLANATION OF PLATES

PLATE 14

Fig. 1. *Physarum melanospermum*. Habit. × 15.
Fig. 2. The same. Capillitium and spores. × 450.
Fig. 3. The same. Spores. × 960.
Fig. 4. *Didymium fulvum*. Habit. × 15.
Fig. 5. The same. Portion of sporangium-wall, with capillitium and spores. × 450.
Fig. 6. The same. Spores. × 960.

PLATE 15

Fig. 1. *Enteridium minutum*. Habit. × 15.
Fig. 2. The same. Portions of interior of aethalia showing varied structure of component sporangium-walls. × 450.
Fig. 3. The same. Spores. × 450.
Fig. 4. The same. Spores. × 960.



ENTERIDIUM MINUTUM STURGIS

STUDIES OF THE SCHWEINITZ COLLECTIONS OF FUNGI—II

DISTRIBUTION AND PREVIOUS STUDIES OF AUTHENTIC SPECIMENS

C. L. Shear and Neil E. Stevens

Schweinitz is known to have given autograph specimens of fungi to no less than fourteen individuals and herbaria.[1] So far as the writers have been able to determine, the specimens sent to Halsey are no longer extant. The herbarium of Zeyher is said by de Candolle (7, p. 461) to be in the museum of the Grand Duke at Carlsruhe. This collection the writers have not examined and it is uncertain whether the Schweinitz specimens of fungi are there. Only a few of the specimens given to Schwaegrichen have been found, one having been seen in the herbarium at Strasburg, and a few in Kunze's collection in the herbarium of the University of Leipzic.

Other collections of fungi distributed by Schweinitz during his lifetime are preserved in the following herbaria: Kew, specimens sent to Torrey and Hooker; Upsala, herbarium of Fries; Academy of Natural Sciences, Philadelphia, Collins collection; Royal Botanic Garden, Edinburgh, herbarium of Greville; Paris Museum, herbarium of Brongniart; Vienna, herbarium of Jacquin; Berlin, herbaria of Link and Ehrenberg; Strasburg, herbarium of Nees von Esenbeck; Leipzic, herbarium of Kunze.

At his death in 1834, Schweinitz's herbarium was left to the Academy of Natural Sciences, Philadelphia. The Academy recognized the importance of this accession and a short time later published the biographical sketch of Schweinitz by Johnson which has been referred to in the preceding paper. The manner in which the specimens of fungi were arranged at the time they were transfered to the Academy, as well as the manner in which

[1] Studies of the Schweinitz Collections of Fungi—I. Sketch of his Mycological Work. Mycologia 4: 191. 1917.

the greater portion of them were subsequently rearranged and mounted has been already described and illustrated by the writers (41, pp. 6–11, pls. 3, 4, 5, 6).

When the former paper was prepared it was apparent that the greater part of the work of rearranging the specimens was done by Dr. Ezra Michener. No evidence could, however, be obtained as to the date at which this work was done. Nor was it clear whether the specimens were rearranged and mounted before or after the studies of Berkeley and Curtis. Realizing the importance of this information the writers have endeavored to obtain further data by correspondence with various people in this country and in England, and recently (December, 1916) have made a thorough search for possible manuscripts which might throw light on the question.

Fortunately, letters preserved in the files of the Academy of Natural Sciences at Philadelphia, which through the courtesy of Doctor Nolan the writers were permitted to examine, enabled them to settle these doubtful points. The early correspondence of the Academy is rather fragmentary, due to the fact that until about twenty years ago there were no salaried officers connected with the institution to whom the care of such matters could be entrusted. About eighteen years ago Doctor Nolan caused such letters as had by chance been preserved to be filed chronologically, and in these files letters from both Curtis and Michener were found. In addition, Miss Elsie M. Wakefield, of the Cryptogamic Herbarium, Royal Botanic Garden, Kew, has generously sent the writers such information as could be obtained from the letters of Curtis to Berkeley, preserved at the British Museum.

From these sources the writers have been able to learn the dates at which Curtis and Michener worked on the Schweinitz herbarium and also much about the work of each. This information is given chronologically below. According to Miss Wakefield:

"The correspondence of Berkeley and Curtis began about 1845 or 1846, and from the replies given in several of Curtis' letters it would appear that Berkeley made inquiries as to the whereabouts and preservation of Schweinitz's collection, the possibility of obtaining duplicates, etc., and urged Curtis to spend some time studying them.

"Curtis at first said it was impossible for him to find time to work in the Schweinitz herbarium.

"In 1851, however, he seems to have spent some time traveling for the sake of his health. In a letter dated October 23, 1851, he mentions some places he visited, and adds: 'My greatest performance was 17 hard—desperately hard—days at work on Herb. Schwein.' At this time there seems to have been no mycologist in charge of the herbarium, and Curtis says that the authorities, knowing the collection was of value, had begun *baking* the specimens in order to destroy insects. He was in time to stop this and to start poisoning operations. He then goes on: 'By the great favour of the Curators I was permitted after much hesitation and some bargaining to take a specimen from the collection when there were more than two of any species. I thus obtained so many, that with my notes and figures I can now authenticate two thirds of Schweinitz's list, I presume. Where I can divide my specimens I will share with you. Wherever I can make three good fragments I mean to give Fries the third. I can send you 10–1,200 I guess."

Evidently Curtis carried out this intention, as the senior writer has seen specimens in the Fries herbarium labeled "Ex Herb. Schwein" in Curtis's hand.

Curiously enough no mention of Curtis's visit could be found in the Proceedings, from which it seems probable that he dealt only with the "authorities," probably the curator of the collections. Curtis's interests in the herbarium and his concern for its preservation, as well as some indication as to the conditions under which he was allowed to take specimens can be obtained from his letter dated Society Hill, S. C., May 24, 1852, and now in the files of the Academy.

"I have been informed that the species of plants from different collectors & Authors in the Herb. of the Academy are much intermingled: so that where the same species is had from two or more persons, the specimens cannot be authenticated. If this be so, it is unfortunate & wrong, & will detract greatly from the value of the collection. If possible, such a course should be prevented in future. I hope, however, this is not the case to

any great extent. In the collection of Fungi,[2] which is the only portion I examined, there is occasional confusion of this sort, which, wherever it occurred, was exceedingly vexatious to me, as it effectually prevented the authentication of the species of the several authors. This would not be a very serious evil, if the specimens were always of one species. But where they differ, the evil is irreparable. I fear that a careless haste has had a good deal to do in causing their confusion. But where there is so much to be done, so few to do it, & labor gratuitous, I suppose we cannot expect everything to be done perfectly. Nevertheless, I hope you & others will see that no further confusion is made in your large & valuable Herbarium.

. . . . . .

"I promised a critical review of the Fungi of Herb. Schweinitz for your Transactions, & also a collection of fungi. These will be prepared as soon as possible, but it will be some time first. Each will be more complete for delay. Please to wait upon me with all patience. I shall not forget the claims of the Academy upon me for the valuable privileges allowed me last Fall."

Shortly after the above letter was written "In a letter dated June 2, 1852," according to Miss Wakefield, "he advises the dispatch of nearly 1,500 of these duplicates of his Schweinitzian specimens. At the same time he mentions that he had promised the Philadelphia Academy a critical review, and asks Berkeley to send him his observations, so that the paper could be published in their joint names.

"Subsequent correspondence deals with the preparation of the two papers,—the one on Surinam fungi, and the 'commentary.'

"Early in 1855 Curtis also sent to Berkeley, for his examination, a parcel of mounted specimens from Herb. Schwein. ('over 300, I believe') which were to be returned when done with, as they were such as could not be divided. There is nothing to indicate whether these were all the remaining specimens in Curtis' possession, or only a part.

[2] The few instances in which such confusion occurs in Schweinitz's original packets, so far as the writers have observed, are those in which Schweinitz himself included specimens received from other collectors.

"Previous to this visit to Philadelphia, at the end of 1850 or very nearly in 1851, Curtis had also received about 200 Schweinitzian specimens from Torrey. These also he divided with Berkeley where possible. Evidently therefore Berkeley never saw the whole of Schweinitz's collection."

Curtis's interest in the herbarium and his concern about its state of preservation seems to have resulted in greater care on the part of the authorities. At any rate in the report of the curators for 1851, the year of his visit, mention is made of the necessity of more carefully guarding the collections.

In the report of the curators for 1855, (1) appears this brief entry: "The herbarium of phanerogamous plants is now undergoing careful rearrangement by Mr. E. Durand; and several of the members intend shortly to rearrange the collection of cryptogamia." Although Dr. Michener is not mentioned, it is certain that at this time he had been selected to rearrange the fungi, as indicated by the following note preserved in the files of the Academy:

"Will T. P. James please say to Dr. Zantzinger when convenient that would like him to see and send on the first order (Hymenomycetes) of Schweinitz Fungi with portfolios paper etc. whenever he can get them ready

"and oblige

"31 of 8 mo 1855" "E. Michener."

The first package of fungi was apparently sent to Dr. Michener late in 1855, for early in the following year he wrote the botanical committee of the Academy of Natural Sciences[3] concerning the problems connected with their rearrangement. In this letter Michener speaks of the poor condition of many of the specimens and the fact that many of them had been destroyed by insects or had otherwise disappeared.

Subsequent letters from Michener to Dr. Zantzinger and to Dr. Meigs, of the Academy, indicate that Michener worked on the fungi at his home in New Garden, Pa., during this and the following winters. For in a letter dated 18th of 3d mo. 1857 he speaks of desiring "the balance of the herbarium." The material was evidently sent to him in several different lots by way

[3] Letter in the files of the Academy dated "New Garden 16 of 1 mo 1856."

of Wilmington, the paper on which the fungi were mounted being furnished by the Academy.

The manner in which Michener mounted the herbarium has been described and illustrated by the writers in another connection (41). It should be noted, however, that in transcribing the labels Michener sometimes did not include all the data given by Schweinitz. For example, the autograph label on the empty packet of *Sphaeria intermedia* L. v. S. says "Bethl in Crataego." The host is not given on the label in the mounted collection.

From the data which the writers have been able to gather it now seems certain that Berkeley never saw the whole of Schweinitz's collection. His work was based on material from three sources, the specimens sent by Schweinitz himself to Dr. Hooker, referred to above, specimens which Schweinitz gave Torrey who sent them to Curtis, and the specimens which Curtis obtained from the herbarium of the Academy of Natural Sciences in the fall of 1851. The greater portion of the specimens which Curtis had he divided with Berkeley and these are now deposited at Kew.

In the published work of Berkeley and Curtis (4), there is no indication as to the source of the particular specimen examined. But in Berkeley's personal copy of the "Synopsis Fungorum in America Boreali" (40), now in the library of the U. S. Department of Agriculture, many of the species are checked in pencil with a small mark √, "C," "H," or with two of these symbols. This the writers take to indicate the source of the specimen, whether from the Hooker collection, loaned by Curtis, or a part of Berkeley's own herbarium. For example, *Sphaeria radicalis* is marked "C" and "H" and there are specimens of this species in Hooker's herbarium and in the Curtis herbarium at Harvard; while *S. gyrosa* is marked "H" and a specimen has been found in Hooker's herbarium. In the early part of the book the species checked are chiefly those on which comment is made in the "Commentary on the Synopsis Fungorum in America Boreali media degentium, by L. D. de Schweinitz" but the marks occur throughout the book.

In the light of the fact that Curtis (see p. 336) sent Berkeley "about 300 specimens" to be returned later, it is of interest to

note that three hundred ten species are marked "C" in Berkeley's copy of the Synopsis Fungorum. Berkeley apparently studied microscopically the specimens which were to be returned to Curtis as in the margins over eighty habit sketches or drawings of spores with occasional notes have been made in pencil. These occur almost uniformly in connection with species marked "C."

So far as the writers have been able to learn, Curtis was the first to work with Schweinitz fungi after his death. His own herbarium then probably includes the first material taken from the Schweinitz collection. The specimens sent to Berkeley and to Fries are portions of the duplicates he took at that time. Michener's work was done a few years later and the specimens in his herbarium, which is now in the Mycological Collections of the U. S. Department of Agriculture, were evidently taken after Curtis's.

Both Curtis and Michener speak, in their letters, of numerous specimens being lacking. Schweinitz, as we stated in a letter to Torrey (Part 1, p. 194), preserved very few of the Agarics, and it is evident that insects have caused great destruction among the fleshy forms that were kept. Moreover, in some cases he apparently gave away his last specimen of some species, as (41, p. 9) when he sent his only specimen of a species of *Hypoxylon* to Schwaegrichen.

Dr. John Shaw Billings was probably the next mycologist to study material from the Schweinitz herbarium. In the introduction to his paper on the genus *Hysterium* (6) he says: "My data for this purpose are derived from the examination of authentic specimens in the Schweinitz herbarium, and in the herbarium of Mr. H. W. Ravenel of South Carolina, from specimens named by Rev. M. A. Curtis, and from the description and figures given by M. Duby in his 'Memoire sur la Tribu des Hysterinees, Geneva, 1861.'"

Mr. Wm. C. Stevenson, Jr., of Philadelphia, became interested in the Schweinitz collection of fungi, according to his recent statement, about 1872, when he was made a member of the herbarium committee of the Academy of Sciences. Mr. Stevenson's interest in mycology early led to a correspondence and exchange of specimens with Mr. J. B. Ellis, of Newfield, N. J., and to a friendship

which lasted during Mr. Ellis's life. Mr. Stevenson did a considerable amount of work on the fungi of the Schweinitz herbarium, his paper on the Valsei of the United States (44) being based on Schweinitz specimens.

In the course of his work on the fungi he to some extent rearranged the specimens and relabeled the portfolios. Stevenson's labels give the numbers of the specimens included in each portfolio, whereas the original labels as prepared by Michener simply give the names of the genera included in the cover but not the numbers. This is evident from four empty covers bearing Michener's labels still preserved in the herbarium. In relabeling the volumes Stevenson evidently placed more sheets in a cover than Michener had done, which accounts for the four empty covers left over.

Certain specimens which were indicated as missing by Stevenson on the folio labels, *i. e.*, Nos. 1493 to 1663 and Nos. 1664 to 1809, were found some years ago in two packages labeled "This package as it came from the Smithsonian Institution." The sheets containing these specimens were placed in their proper places in the portfolios by Prof. J. C. Arthur and the senior writer during a visit to the herbarium in February, 1917, and a note to that effect placed on the labels of the portfolios. This the writers take to indicate that these specimens were loaned to the Smithsonian Institution before Stevenson relabeled the portfolios. Duplicates of many of these missing specimens are in the Curtis collection at Harvard. Dr. Farlow writes that there are 32 of the 42 species of *Puccinia* mentioned in North American Fungi (40) and 28 of these species are checked in Berkeley's personal copy. The Michener collection contains specimens of 37 of Schweinitz species of *Puccinia.*

In the last volume of the fungi as now arranged Nos. 2905 to 2972 (containing *Puccinia,* etc.) also 2973 to 2997 inclusive are missing. The original packets of Schweinitz are in the collection, as are the portfolios, bearing Michener's labels, which originally contained *Puccinia* and related genera. This indicates that Michener mounted these specimens as well as the others and that they disappeared subsequent to this work. In many cases where specimens are missing in the mounted collection there are pin holes

in the sheets showing apparently that the specimens were placed there by Michener but have since been removed.

During 1885 and 1886, Dr. J. W. Eckfeldt, of Philadelphia, critically examined and arranged the lichens in the herbarium of the Philadelphia Academy of Science. At this time the type collections of Schweinitz and Tuckerman were kept separate from the others and undisturbed. A general catalogue was, however, prepared in order to facilitate reference to these collections. Dr. Eckfeldt lists 462 species as occurring in the Schweinitz collection of lichens (1, p. 342).

It is evident that Tuckerman at some time made careful study of the lichens of the Schweinitz herbarium, for in Michener's list of lichens of Chester County (36, p. 451) Tuckerman, who prepared the descriptions of new species for this list, cites, as a new species, *Endocarpon arboreum,* Schweinitz, MS., and in his North American Lichens (45, p. 148) he says, "*Cladonia cetrarioides,* Schwein. herb. (Tuck. Suppl. 1, l. c. p. 427) is still only known to me in the original specimens (from North Carolina) of Schweinitz."

Ellis's studies of fungi in the Schweinitz collections, (22, 23) were all made, according to Mr. Stevenson, at the Academy. The later paper was apparently based on fungi from the "Collins Collection," which was found in 1894 in the herbarium of the Academy of Natural Science where it "had lain unnoticed for many years."

Durand (21) in preparing his monograph of the Geoglossaceae of North America studied Schweinitz's types in the herbarium at Philadelphia.

Lloyd (35) after "several visits" to Philadelphia for the purpose of studying Schweinitz's specimens published a revision of a number of species. Lloyd's conclusions as to the material on which the work of Berkeley and Curtis was based are evidently erroneous, as shown by the correspondence cited above.

In connection with their studies of the genus *Endothia* the writers have recently published (41) a discussion of the specimens collected by Schweinitz, based partly on specimens in the Philadelphia herbarium.

Berkeley and Curtis, Billings, Stevenson, Ellis, Tuckerman,

Durand, Lloyd, and the writers, have been mentioned as having published observations based on material in the Schweinitz herbarium at Philadelphia. Several of these investigators have also examined Schweinitzian specimens in other Herbaria. Berkeley had those contained in Hooker's herbarium at Kew and specimens sent by Torrey to Curtis. Durand mentions among the herbaria in which he studied (21, p. 393) Fries's herbarium at Upsala, The Kew Herbarium, and the Curtis Herbarium at Harvard. In connection with their studies on the genus *Endothia* the writers examined specimens in the Curtis and Michener herbaria and the senior writer examined specimens in all the European herbaria in which Schweinitz's specimens are known to exist (see page 333).

Berlese (5) cites original specimens of Schweinitz sent to him from Kew by Cooke. Cooke's (8–17) studies are based on Schweinitz material in the herbarium at Kew, as are also those of Currey. Currey (18–20), however, as the titles indicate, confined his published work largely to specimens in Hooker's herbarium. In the researches of Dr. Farlow (24–28), studies of Schweinitzian material are based chiefly on the Curtis collection, now in his own herbarium at Harvard. Fries (29, 30) and Kunze (33), of course, received specimens directly from Schweinitz, but the latter also had specimens given him by Schwaegrichen (p. 333). Von Höhnel mentions (31, p. 393) having studied material from the herbaria at Berlin, Kew, Paris and Upsula, but makes few specific references (see 32, p. 356) to the source of particular specimens. Lister's (34) studies of Schweinitz's types are based on material at Kew. Nitschke (37) studied material from Kuntze's herbarium at Leipzic. Starbäck (42, 43), as the title of one of the papers indicates, based his work on material in Fries's herbarium, while the Tulasnes (46) had available the Brongniart herbarium, in Paris.

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NEW OR NOTEWORTHY NORTH AMERICAN FUNGI

JOHN DEARNESS

1. **Valsa clavigera** Dearn. & Barth.

Stromata cortical, removable with the bark and leaving no discoloration on or in the subjacent wood; thickly gregarious, or subseriately arranged, pustulate, hemispheric, .75–1.5 mm., mostly 1 mm., in diam. Perithecia black, 5–15 mostly 8–11 in a stroma, circinate immediately under the epidermis, globose, .3–.4 mm., with clavate ostiola .5–.7 mm. long, 90 μ across neck, 180 μ across head, crowded, and usually obliterating the pale disk. Asci subglobose to fusoid, 27–40 μ. Sporidia conglobate to obliquely biseriate allantoid, $9 \times 2.5\ \mu$.

On dead branches of *Schizonotus discolor* (Ph.) Raf., Bremerton, Wash., July, 1912. *Bartholomew, 4782.* Type collection, Fungi Columb. *5099.*

This is different from, although near *V. opulifolia* Peck, with authentic specimens of which it has been compared.

What appears to be this species (*V. clavigera*) on fire-killed *Acer macrophyllum* Ph. in the same locality has larger stromata with more numerous perithecia. This form is distributed in Fungi Columb. *5098.*

2. **Diatrypella minutispora** sp. nov.

Stromata scattered, gregarious, or seriate, small, mostly about 1 mm. at base, nearly superficial on the cortex, not blackening the subjacent tissues, rupturing the epidermis into very narrow, often elongate clefts. Perithecia black on a brownish, expanded, basal stroma, .2 mm. but variable in size and shape, rough, shining above, truncate-conic in the best developed examples, 3 to 5 in a stroma; ostiola short, obtuse, perforate. Asci stipitate—stipe sometimes half the total length, sp. p. obtuse-fusoid, $60–75 \times 12\ \mu$;

[1] Acknowledgments for opportunity to examine type and co-type specimens or for citations of literature are due to Dr. H. D. House, Dr. R. E. Stone, Dr. F. J. Seaver, and Mr. C. G. Lloyd.

paraphyses linear, looking as though they contained a line of spores, sometimes twice as long as the asci. Sporidia innumerable, hyaline, very minute, straight or somewhat curved, 3–3.5 × .5–.7 μ.

On dead branches of *Corylus rostrata* Ait., Washington Co., N. Y., June, 1916. *S. H. Burnham, 89.*

Diaporthe tessera Fr. is mixed with it in the type material. In several particulars this agrees with the European *D. Tocciaeana* de Not., a species which Dr. Peck reported on hazel at Sandlake, N. Y.; but the latter is said to exhibit a dark circumscribing line and to have brownish sporidia, 5–7 × 1.5 μ.

3. BOTRYOSPHAERIA SUMACHI Cooke, Grevillea **15**: 80. 1887

Sphaeria Sumachi Schw., Syn. N. Am. Fungi *1425*. 1832.

Sphaeropsis Sumachi (Schw.) Cooke & Ellis.

Haplosporella Sumachi (Schw.) Ellis & Ev., N. Am. Pyrenom. 744. 1892.

Mr. S. H. Burnham's *125* on *Rhus glabra,* Warren Co., N. Y., is ascigerous—a *Botryosphaeria* whose stromata externally and in cross section are exactly like Prof. Peck's W. Albany collection on the same host labeled *Sphaeropsis Sumachi* (Schw.) Cooke & Ellis. The latter is really a *Haplosporella* consisting as it does of flat, black stromata containing 2–8 internally white pycnidia. 75–90 μ. The former shows both the brown conidia of the latter and thick-walled asci containing eight hyaline, fusoid sporidia 18–20 × 6–8 μ. It may be another of the numerous forms of *Botryosphaeria fuliginosa* (M. & N.) but the perithecia are not botryoidally aggregated and the asci and sporidia are smaller. Cfr. *Haplosporella Burnhami* sp. nov. on a subsequent page.

My copy of Fungi Columb. *1053* labelled *Sphaeropsis Sumachi* (Schw.) is not a *Haplosporella.* The spores are larger and usually contain a single large nucleus instead of the usual two nuclei of *Haplosporella Sumachi.*

4. SPHAERELLA TRICHOPHILA Karst. f. *Saxifragae*

This *Sphaerella* has characters connecting it with *S. minor* Karst. and with *S. pachyasca* Rostr. both of which inhabit *Saxi-*

fraga in Greenland. But the bristles near the vertex, the brown subiculum and the fruit characters bring it closer to *S. trichophila* Karst. The last inhabits species of *Pedicularis* in West Greenland. *Saxifraga* seems to be a new host for it. Rostrup found the sporidia on *Pedicularis* 20–25 × 6–7 μ; this has asci 45–62 × 15–16 μ and sporidia 15–18 × 5–6 μ.

On *Saxifraga Nelsoniana* D. Don., Camden Bay, northern Alaska. *F. Johansen,* Can. Arc. Exped., June, 1914.

5. **Venturia subcutanea** sp. nov.

Perithecia membranaceous, nearly black, gregarious, erumpent through or covered by the loosened cuticle, hypophyllous, attached to a subicle of septate, branching, brown fibrils, 4–20 μ thick, making orbicular spots 1–4 mm. in diameter; hardly visible on the upper side of the leaf but opaque when held to the light. Some of the perithecia bearing few to 10 short, rigid, brown bristles near the stoma, others smooth; plano-globose to conic, 90–150 μ. Asci 8-spored, aparaphysate, often broadest near the base, 54–66 × 10–15 μ, the walls 2 μ thick. Sporidia 1-septate, fuliginous, often biseriate in the lower half, 15–17 × 4.5–6 μ.

On dead leaves of *Salix reticulata* L., Kongengevik, N. Alaska, June, 1914. *F. Johansen, 63 b,* Can. Arc. Exped.

This variable species was sought in lists of *Sphaerella, Asterina* and *Venturia.* The perithecia attached to the cuticle seem to lack the bristles while those that are free from it but covered by it possess them.

6. (?)**Myrmaecium Cannae** Dearn. & Barth. sp. nov.

Stromata minute, mostly about .25 mm., largest 1 mm., scattered over the leaf, erumpent on both sides but mostly hypophyllous, blackened by the perithecia. Perithecia black, one to several in a stroma, 17 the largest number counted in one stroma, globose to truncate-conic, 90–180 μ. Ostiola short, blunt, black, shining. Asci short-stipitate, 60–90 × 6–10 μ; paraphyses linear, some of them branched. Sporidia hyaline, 1-septate, upper cell larger, 10–15 × 4–8 μ. Some of the perithecia filled with conidia and sporophores; conidia linear-oblong, obscurely 1-septate, 15 × 2.5–3 μ.

On withered leaves of *Canna Indica* L., Cabo Rojo, Porto Rico, Oct., 1912. *F. L. Stevens.* Ex herb. Bartholomew *303.* Type collection, Fungi Columb. *5038.*

7. **Diaporthe exiguestroma** sp. nov.

Stromata minute, scattered, seated in the unaltered cortex, not reaching the wood, no circumscribing line, circularly rupturing the epidermis, mostly about .3 mm. in diameter. Perithecia one, two or three in a stroma, white in cross-section, .1–.2 mm.; ostiola when visible short, blunt. Asci comparatively few in a perithecium 75–90 × 15 μ, paraphysate. Sporidia subbiseriate hyaline, uniseptate, constricted, quadrinucleate, straight or slightly curved, ends rounded, 18–24 × 6–7 μ.

On dead stems of wild rose, *Rosa* sp. Vancouver Island, July, 1916, *John Macoun, 923.*

8. DIAPORTHE OXYSPORA (Peck) Sacc.

Valsa oxyspora Peck, Ann. Rep. N. Y. State Mus. **28**: 75. 1876.
Valsa ocularia Cooke & Ellis, Grevillea **6**: 11. 1877.
Diaporthe epimicta Ellis & Ev. N. Am. Pyrenom. 439. 1892.

Comparison of the type of *D. oxyspora* (Peck) Sacc. with specimens named respectively *D. ocularia* and *D. epimicta* by Mr. Ellis and some recent collections leads to the conclusion that these names are synonyms. Of my *1645* found on *Ilex* in 1890 which Mr. Ellis first took to be a *Diatrype,* he later wrote that it was a new species which he proposed to name from *epimiktos*—confused—separating it from *D. ocularia* on account of the appendiculation of its sporidia. The appendages are not, however, constant or persistent, for I have specimens from a single brush pile of *Ilex,* showing them to be distinct or obscure or lacking. Prof. Peck's type was reported "on oak limbs" but Dr. H. D. House has found that the host material was *Nemopanthes.*

9. **Protoventuria vancouverensis** sp. nov.

Perithecia scattered, carbonous, thin, globose to conic, bristly, 120–150 μ; bristles rigid, acuminate, pungent, 30–55 × 4–6 μ at base. Asci fusoid-cylindric, straight or curved, 45–55 × 14 μ; paraphyses linear, longer than asci, not abundant. Sporidia fuliginous, 2–3-seriate, uni-septate, bi- tri- or quadrinucleate, the upper cell wider than the lower one and often containing one large nucleus when the narrower, lower cell contains two, 14–15 × 4.5–5 μ.

On dead maple bark (*Acer* sp.). Vancouver Island, August, 1916, *John Macoun, 1003.*

10. MASSARINA DRYADIS Rostr. Meddel. Groenl. 3: 560. 1888.

Plants of *Dryas octopetala* (L.) much discolored were collected by Mr. F. Johansen, of the Can. Arc. Expedition, near the mouth of Coronation Gulf, July, 1916. The oldest and most sered leaves bore numerous, dark-brown, sphaeroid-depressed to conic, membranaceous, partially immersed perithecia containing asci and sporidia agreeing exactly with Rostrup's description. The ostiola, however, instead of being "niveo" were merely whitish and that only when more or less perforate. The sporidia—not reported by Rostrup—were mostly about $30 \times 15\,\mu$ and the asci while mostly about $100 \times 33\,\mu$ varied in length from 60 to $150\,\mu$. Rostrup's fungus is listed in synopses of North American species of *Massaria* but if Mr. Johansen's plant is the same, and it probably is, the fungus is not a good *Massaria*.

11. **Leptosphaeria Gaultheriae** sp. nov.

Perithecia scattered, black, seated on the cortex and erumpent through the thin cuticle or quite superficial where the latter is thrown off, ovoid-conic to globose, $115–275\,\mu$ in diameter. Ostiola short, black, conic, shining. Asci broad-linear, $75–80 \times 6.5–7\,\mu$, paraphyses present, simple or divided. Sporidia pale brown, uniseriate, overlapping, 3-septate, larger in upper half, $12–16 \times 5\,\mu$.

On dead stems of *Gaultheria Shallon* Pursh, Vancouver Island, August, 1916, *John Macoun 980*.

12. **Asterina** (*Asterella*) **fumagina** Dearn. & Barth. sp. nov.

Perithecia epiphyllous, gregarious or nearly covering the leaf with a sooty layer resembling *Fumago;* seated on dichotomous, anastomosing mycelium of brown, septate hyphae, $5–6\,\mu$ thick; crowned with 1–3 pungent, dark-brown, rigid setae, $100–400 \times 4–9\,\mu$; rugose, dark-brown, globose, .3–.5 mm. in diam. Asci sessile, short-elliptic to pyriform, $45–60 \times 25–30\,\mu$, wall $3\,\mu$ thick, few to 10 in a perithecium. Sporidia hyaline, grumous-nucleate, clavate-oblong, 1-septate, variable in size, $15–25 \times 8–12\,\mu$, upper cell larger than the lower.

On living leaves of *Panicum latifolium* (?), Maricoa, Porto Rico, Jan., 1913, *F. L. Stevens*. Ex. Herb. of E. Bartholomew *190*.

13. LOPHIOSTOMA EXCIPULIFORME (Fr.) Ces. & DeNot. Comm. Soc. Crit. Ital. **1**: 219. 1863

"We have seen no American specimens of the normal form on bark of deciduous trees."—Ellis & Ev. N. Am. Pyrenom. *222*. Their variety *abietis* differs in having larger spores up to 75 μ and narrower ostiola. Mr. S. H. Burnham's *117* on maple bark collected at Hudson Falls, N. Y., agrees well with the description based on Rehm's *238*. The nearly superficial perithecia with prominent ostiola enlarged at the top, the 6–7 septate, non-constricted sporidia mostly about 33–35 × 9–10 μ with subhyaline end cells, leave no room to separate this from the European forms.

14. **Phacidium Gaultheriae** sp. nov.

Apothecia scattered, conspicuous by their dark color on the whitened stems of the host, stellately ruptured, .75–1.25 mm. The whitened areas upon which the apothecia are seated extend wholly or partially around the stem and are bounded by a raised line. Asci cylindric-clavate, 90–110 × 10–12 μ; paraphyses abundant, linear, some of them branched. Sporidia hyaline, grumous or uninucleate, obliquely uniseriate or sub-biseriate, 19–22 × 6–6.5 μ.

On living stems of *Gaultheria Shallon* Ph.; Vancouver Island; August, 1916, *John Macoun 978*.

15. HELVELLA SPHAEROSPORA Peck, Ann. Rep. N. Y. State Mus. **27**: 106. 1875. **31**: 59. 1879. **47**: 43. 1894. and Bull. **51**: 299. 1897

This rare and interesting species well marked by its globose spores was found in quantity on old sawdust heaps near the Ottawa River, June, 1917, by Mr. W. S. Odell. Dr. F. J. Seaver reports its recent collection by Prof. Orton in Vermont.

16. **Exoascus Aceris** Dearn. & Barth. sp. nov.

Spots subcircular or irregular, .5–1.5 cm., reddish-gray on the upper side, paler beneath, deciduous. Asci numerous, hypophyllous, short-clavate or cylindric, mostly about 30 × 9 μ. Sporidia hyaline, sub-globose or irregular, 4.5–6 × 3–4.5 μ.

On living leaves of *Acer grandidentatum* Nutt., Parley's Canyon, Utah, June, 1915. *Bartholomew* and *Garrett 5839*. Type collection, Fungi Columb. *5018*.

17. CALVATIA CRETACEA (Berk.) Lloyd, Myc. Notes 650, f. 929. 1917

Lycoperdon cretaceum Berk., Jour. Linn. Soc. **17**: 18, 1878.

Peridium subglobose, 4–5 cm., the prominent warts of the upper cortex gradually reduced on sides and base to a granular or pruinate layer; sterile base shallow, radicating; spores echinulate, average 6.2 μ, capillitium olive-brown, 12 μ thick, branches much smaller (6 μ).

Collected on the Can. Arc. Exped., 1913–'16, on tundra slopes of the Mackenzie Delta (*O'Neill*), and on Herschell Island and around Coronation Gulf. *F. Johansen.*

This would seem to be a common species in the tundra near 70° N. Lat. The spores show that it cannot be *C. coelata* Bull. which it otherwise approaches. The likely supposition that it might be *C. arctica* F. & W. was rejected on comparison with the details of warts, capillitium, basidia and spores given in the fine plate in Meddelelser om Groenland 43. I referred a description under the MS. name *C. borealis* to Mr. C. G. Lloyd who fortunately had examined and photographed Berkeley's imperfectly described *Lycoperdon crustaceum* collected in the Nares' Expedition. This with material from Lapland, per Thore C. E. Fries, enabled him to establish the above determination.

18. **Phyllosticta brunnea** Dearn. & Barth. sp. nov.

Spots ashy but receiving a brownish cast from the numerous pycnidia; immarginate, .5–1 cm. in diameter. Pycnidia epiphyllous, reddish-brown, very numerous, crowded, depressed, 90–150 μ. Conidia hyaline, oblong, 4–6 × .75–1 μ.

On languishing, yellowish leaves of *Populus angustifolia* Jas., Montrose, Colo., Oct. 1912. *E. Bartholomew 5001.* There are also on all the leaves darker, more opaque, sterile spots. Type collection, Fungi Columb. *5040.*

19. **Phyllosticta smilacina** (Peck) comb. nov.

Sphaeropsis smilacina Peck, Ann. Rep. N. Y. State Mus. **33**: 24. 1883.

Phoma smilacina (Peck) Sacc. Syll. Fung. **3**: 160. 1884.

Marcophoma smilacina (Peck) Berl. & Vogl. Sacc. Syll. **10**: 205. 1892.

Ascochyta Smilacis Ellis & Mart. Amer. Nat. **16**: 1002. 1882.

Stagonospora Smilacis (Ellis & Mart.) Sacc. Syll. Fung. **3**: 450. 1884.

Phyllosticta Smilacis Ellis & Mart. in Herb. 1898; in Ellis & Evrht.'s N. Amer. Phyllostictas 72. 1900.

Phyllosticta Smilacis Ellis & Ev. Bull. Torrey Bot. Club **27**: 572. 1900.

Prof. Peck described this species on *Smilax rotundifolia* as follows: "Spots orbicular, 2 to 3 lines broad, arid, whitish with a dark border; perithecia epiphyllous, subhemispherical or depressed, black, often disposed in a circle near the margin of the spot; spores oblong or subfusiform, colorless, .0008 in. to .0012 in. long, about .0003 in. broad."

Ellis & Ev. *op. cit.* "Perithecia epiphyllous, 110–150 μ; sporules oblong-fusoid, hyalin, mostly nucleate, subinequilateral, 12–15 $\times$ 3.5–4 μ" adding that it is found on various species of *Smilax* and varies considerably in the size and shape of the sporules.

There are before me specimens, including types or co-types, from over twenty widely separated collections bearing one or other of the above names. The spots are, except in Fungi Columb. *4247*, uniformly whitish becoming dingy near the rusty-brown, raised border. On a Niagara specimen out of one spot spores measured 9 $\times$ 6 μ, 10 $\times$ 5 μ, 15 $\times$ 8 μ and 18 $\times$ 6 μ. On a leaf of one of the type collections they ranged from 9 $\times$ 5.5 μ to 24 $\times$ 6 μ; in another spot on the same leaf they were pretty uniformly 7–9 $\times$ 6–7 μ. On the spots the pycnidia are mostly sub-circinate but often more or less scattered and mostly but not always epiphyllous. The sporules are sub-globose to oblong-fusoid or inequilaterally elliptic, hyaline, grumous, often nucleate, sometimes *appearing* septate, 7–24 $\times$ 4–8 μ, usually within 8–12 $\times$ 4–7 μ.

20. **Macrophoma Salicis** Dearn. & Barth. sp. nov.

Pycnidia thickly distributed, sometimes gregarious or seriate, cortical, rupturing the cuticle in a cleft or stellate manner, .25–.5 mm. in height and diam. Ostiola thick, short or longer up to .3 mm. Conidia hyaline, continuous, ovoid to oblong or fusoid, 12–16 $\times$ 6–9 μ.

On dead twigs of *Salix exigua* Nutt., Billings, Mont., Aug., 1913, *E. Bartholomew 5207*.

21. **Macrophoma ulmicola** Dearn. sp. nov.

Pycnidia thickly scattered, 1 per sq. mm., surrounding the branches, raising the epidermis into transversely ruptured pustules, immersed in the cortex, not reaching or discoloring the wood, globose, .3–.5 mm. in diameter, ostiola short, hardly visible through the ruptured epidermis. Conidia abundant, hyaline, granular, ovate, 18–30 × 15–18 μ, wall 2–2.5 μ thick, on short conidiophores.

On dead branches of *Ulmus americana* L., Hudson Falls, N. Y., March, 1916, *S. H. Burnham 126*.

Sometimes two or three pycnidia are confluent then suggesting *Dothiopsis* but they are normally and mostly single and separate.

22. **Cicinnobolus major** Dearn. & Barth. sp. nov.

Pycnidia amphigenous, amber-colored, sometimes so numerous as to impart their color to the whole surface of the leaf, on a dense, white mycelial subicle, limoniiform, 75–120 × 30–45 μ. Spores hyalin, continuous, 6–8 × 3 μ.

On *Oidium* on living leaves of *Grindelia squarrosa* (Ph.), Billings, Mont., Aug., 1913, *E. T. & E. Bartholomew 5024*. Type collection, Fungi Columb. *5007*.

C. Cesatii, fide Saccardo, has spores 2.5–3 × 1 μ.

23. **Sphaeropsis Diospyri** Dearn. & Barth. sp. nov.

Pycnidia seated in the dead cortex, .3–.4 mm., so closely clustered in some places as to cover the twig and suggest a *Haplosporella*. The white core around which the brown conidia tardily develop is Phoma-like and produces numerous minute hyaline spores. Conidia brown, 20–25 × 7–10 μ usually with a median nucleus that gives them the appearance of being septate.

On dead twigs of *Diospyros Virginiana* L., Shreveport, La., Oct., 1913, *E. Bartholomew 5458*. Type collection, Fungi Columb. *5088*.

24. **Sphaeropsis latispora** (Peck) sp. nov.

Sphaeropsis Smilacis Ellis & Ev. var. *latispora* Peck, Bull. N.Y. State Mus. **150**: 39. 1910.

Sphaeropsis Smilacis Ellis & Ev. is a *Melanconium.* Prof. Peck's var. on *Smilax hispida* founded on a collection by Dr. Fairman in Yates Co., N. Y., 1909, is a good *Sphaeropsis.* The pycnidia are thickly scattered, .25 mm. in diameter, minutely puncturing the epidermis. "Conidia 17–20 × 11–13 μ"—Peck. Exceptional spores vary from 12–25 μ in length and in shape from globose to oblong-elliptic. Collections examined, Kansas, 1906, *Bartholomew;* London, Ont., 1895, *Dearness;* Long Island, N. Y., 1916, *House.*

25. **Haplosporella Burnhami** sp. nov.

Stromata irregularly globose to linear, 2–10 mm. Pycnidia partly immersed, connate at base, their position indicated by narrow rifts in the bark, mostly about .2 mm. in diameter; ostiola various, a mere perforation or a cylindric or conic beak; flesh whitish at first, becoming gray. Conidia oblong-elliptic with rounded ends or pyriform, brown at maturity, 1–2-nucleate, 18–24 × 10–12 μ; conidiophores rather stout, some of them as long as the spores.

On dead stems of *Rhus Toxicodendron* var. *radicans* (L.,) Torr., Washington Co., N. Y., May, 1916, *S. H. Burnham 112.*

Sphaeropsis Sumachi (Schw.) Cooke & Ellis is described as having subconfluent perithecia in dark stromata,—so possibly it may be a *Haplosporella.* Mr. Burnham's material has been compared with specimens on *Rhus glabra* and *R. hirta* named *S. Sumachi* by Dr. Peck and by Mr. Ellis. There seems more difference in the specimens than is implied in the descriptions.

26. **Septoria samarae-macrophylli** Dearn. & Barth. sp. nov.

Spots conspicuous, reddish-brown, subcircular areas in the wings of the samarae, 2–5 mm. in diameter. Pycnidia pale, thin-walled, 80–120 μ. Sporules numerous, continuous or 1–2 septate, some of them minutely guttulate, 30–65 × 2–2.5 μ, less curved and thicker than in *S. aceris-macrophylli* Peck; spots quite distinct from those of *S. circinata* Ellis & Ev. and from *S. samarae* Peck on keys of *Acer negundo.*

On green samarae of *Acer macrophyllum* Ph., Duckabush River, Wash., Aug., 1912, *E. Bartholomew 4858.* Type collection, Fungi Columb. *5086.*

27. **Septoria Sarcobati** Dearn. & Barth. sp. nov.

Pycnidia nearly black, immersed in the somewhat reddened calyx wings, amphigenous, sometimes widely perforate, with the spores issuing in pale cirrhi; 90–200 μ in diam., wall thin. Sporules straight or curved, obtuse, 1-septate, 30–45 $\times$ 5–6 μ.

On calyx wings of *Sarcobatus vermiculatus* (Hook.) Torr., Tromberg, Mont., Sept., 1913, *E. Bartholomew 5324*.

28. (?) **Melasmia Menziesiæ** Dearn. & Barth. sp. nov.

Stromata externally black, reticulated over a yellowed area, .5–1 cm., epiphyllous, consisting of a whitish, pseudo-prosenchymatic layer about .3 mm. thick; the sporiferous tissue in radiating, narrow ridges. Conidia 3 $\times$ 1 μ or less on a basidial stratum 8–10 μ in depth.

On living leaves of *Menziesia ferruginea* Sm., Duckabush, Wash., Aug., 1912, *E. Bartholomew 4845*. Type collection, Fung Columb. *5035*.

29. **Leptothyrella Caricis** Dearn. & Barth. sp. nov.

Pycnidia carbonous, dimidiate, astomous, superficial, .2–.7 $\times$ .2–.3 mm. One or a few short bristles are found on an occasional pycnidium. Sporules hyaline, 20–25 $\times$ 3–4 μ, obscurely 1-septate, in some instances appearing 2–3-septate.

On withered leaves of *Carex stricta* Lam., Stockton, Kansas, May, 1913, *E. Bartholomew 5019*. Type collection, Fungi Columb. *5031*.

30. **Gloeosporium Ailanthi** Dearn. & Barth. sp. nov.

Spots circular, .5–1 cm., bordered, grayish-brown, similar beneath except that the border is not definite, often confluent, circinately ridged. What may be *Cercospora glandulosa* Ellis & Kellerm. is on the same spots. Acervuli epiphyllous, large, 180 μ, dark, waxy. Spores hyaline, oblong with rounded ends, some of them appearing septate probably due to grumous particles gathering towards the ends and leaving a clear space near the middle, 11–16 $\times$ 5–7 μ, mostly about 13 $\times$ 6 μ.

On living leaves of *Ailanthus glandulosa* Desf., Shreveport, La., Oct., 1913, *E. Bartholomew 5400* (b). Type collection, Fungi Columb. *5021*.

This possibly attacks the leaves only after they are weakened by the *Cercospora* which accompanies it.

31. **Gloeosporium Bartholomaei** sp. nov.

Spots numerous, sooty, quadrate, 1–3 mm. across, paler below but nearly similar, opaque when held to the light. Acervuli amphigenous but mostly epiphyllous, the spore-masses waxy, honey-colored, in crateriform ruptures of the epidermis. Spores fusoid, subacute, hyaline, the nucleation causing some of them to appear septate, 20–24 × 5.5–6 μ, extremes in length 15 to 30 μ, in width 4–6.5 μ.

On living leaves of *Ribes bracteosum* Dougl., Port Orchard, Wash., July, 1912, *E. Bartholomew 4763*. Type collection, Fungi Columb. *5022*.

32. **Gloeosporium Betae** Dearn. & Barth. sp. nov.

Spots circular, conspicuously circinate, dark-gray, sometimes confluent and then large areas of the leaves become sordid yellow, similar on both sides, .5–1 cm. Acervuli innate; even when their positions cannot be detected with the lens, sections in water usually give one or more oozing cirrhi of spores. Spores abundant, hyaline, minutely nucleate, 3.5–5 × 3–4 μ.

A typical *Gloeosporium* on living leaves of sugar beet, *Beta vulgaris* Willd., very destructive. Billings, Mont., Aug., 1913, *E. Bartholomew 5173*. Type collection, Fungi Columb. *5023*.

33. **Gloeosporium Crataegi** Dearn. & Barth. sp. nov.

Spots circular, white above with a diffuse, reddish border, reddish when held to the light and on the under side of the leaf, 2–3 mm. in diameter. Acervuli epiphyllous, circular (60–90 μ) to hysteriiform (.5–1.5 mm. by 60–100 μ), the sporiferous factors with the spores rupturing the cuticle and rising in a mass from .6 to 1 mm. above the level of the leaf. Conidia hyaline, often nucleate at each end, 4–6 × 2–3 μ.

On living leaves of *Crataegus brevispina* (Dougl.) Heller, Vancouver, Wash., Sept., 1912, *E. Bartholomew 4957*. Type collection, Fungi Columb. *5024*.

34. **Melanconium Smilacis** (Ellis & Ev.) comb. nov.

Sphaeropsis Smilacis Ellis & Ev. Jour. Myc. **5**: 149. 1889.

Examination of a portion of the type collection, H. J. Webber's

34, 1888, on *Smilax hispida* at Lincoln, Nebraska, fails to reveal any pycnidial wall. Irregular acervuli develop just beneath the cuticle rupturing it sometimes at more than one point. Conidia with nuclei half to three fourths of their size, oblong with rounded ends, 9–20 × 6–7 μ, mostly 16 × 6 μ, are mixed with enucleate, subinequilateral ones 7–10 μ wide.

35. **Marssonina bracteosa** Dearn. & Barth. sp. nov.

On arid, brownish areas of the leaves and discolored petioles, not definitely limited. Acervuli yellowish, epiphyllous, seated on the veins and veinlets, .1–.2 mm. Spores hyaline, in hemispheric masses, mostly 1-septate, some of them continuous or septum not discernible, 4–8 × 2–2.5 μ.

On living leaves of *Ribes bracteosum* Dougl., affected with *Gloeosporium Bartholomaei* Dearn., Fungi Columb. *5022*, the acervuli as well as the spores of the latter being much larger than those of the *Marssonina*. Port Orchard, Wash., July, 1912, *E. Bartholomew 4763* (a).

36. (?) SEPTOGLOEUM NUTTALLII HARK.

The following description was written out under the proposed name *Cylindrosporium Osmaroniae* sp. nov.; but it seems to be very close to *Septogloeum Nuttallii* Hark. Jour. Myc. 1: 117, if not identical with it.

An affected part of the leaf is somewhat paler than the adjacent area and when such part is held to the light and examined with a lens the acervuli are visible as opaque dots each surrounded by a narrow translucent ring. These may become confluent and appear as brown spots 2–3 mm. in diameter. Acervuli amphigenous but mostly hypophyllous, 50–100 μ in diameter, usually more prominent at the margin than in the center, yellowish, resembling young uredosori. Conidia hyaline, 1–several-septate, mostly 1-septate, usually multinucleate, subarcuate and subacute, 30–50 μ, mostly 45 × 3 μ.

On living leaves of *Osmaronia cerasiformis* (T. & G.) Greene, Vancouver Island, July, 1916, *John Macoun 933*.

37. **Septogloeum Schizonoti** sp. nov.

Spots numerous, irregular, scattered, dark-brown, 1–5 mm., mostly in indefinite areas that become orange or reddish and often extending over the whole leaf. Acervuli amphigenous but mostly epiphyllous, nearly concolorous, the larger ones with a prominent rim and depressed disc, 75–200 μ. Sporules hyaline, subarcuate, 30–45 × 5–7 μ, mostly 2-septate.

On living leaves of *Schizonotus discolor* (Pursh) Raf. Vancouver Island, August, 1916, *John Macoun 969*.

This may be only a variety of the preceding species.

38. **Septogloeum Salicis-Fendlerianae** Dearn. & Barth. sp. nov.

The spots are somewhat arid, subcircular areas, 2–4 mm., bounded by an unbordered, raised line, more distinct on the upper side of the leaf. Acervuli amphigenous but mostly epiphyllous, pycnidia-like in the younger stages but developing into circular, yellowish-hyaline depressions, 100–150 μ. Sporules hyaline, grumous, curved, mostly 1-septate, 15–50 × 3.5–6 μ, mostly about 45 × 5 μ.

On living leaves of *Salix Fendleriana* Anders., Caldwell, Idaho, Sept., 1912, *E. Bartholomew, 4968*. Type collection, Fungi Columb. *5085*. Many of the leaves in this collection bear numerous brown, angular spots which mark the areas occupied by the *Septogloeum*.

Fungi Columb. *3779* and *4387* are this species. It is quite distinct from *Septogloeum salicinum* (Peck) Sacc.; indeed it comes nearer *Cylindrosporium salicinum* (Peck) Dearn.

39. **Cylindrosporium Artemisiæ** Dearn. & Barth. sp. nov.

Spots brown, angular, following the veins, becoming confluent, indistinctly visible through the tomentum on the lower side of the leaf. Acervuli numerous, epiphyllous, concolorous, 60–90 μ. Sporules hyaline, subclavate, subflexuous, 1–5-septate, 20–50 × 3–4 μ.

On living leaves of *Artemisia Suksdorfii*, Piper, Pleasant Beach, Wash., August, 1912, *E. Bartholomew, 4892*. Type collection, Fungi Columb. *5010*.

40. **Cylindrosporium salicinum** (Peck) comb. nov.

Septoria salicina Peck. Ann. Rep. N. Y. State Mus. **25**: 87. 1873.
Septoria albaniensis Thüm. Bot. Gaz. **5**: 122. 1880.
Phleospora Dearnessii Sacc. 1914.

In Mycologia **8**: 105, I drew attention to the confusion in the names of *Cylindrosporium* on *Rhus* spp. due to the wide variation in size of the spores and the uncertainty as to whether they are formed in a true pycnidium.

Similar confusion obtains in respect to the names of species parasitic on the leaves of *Salix* spp. which in my own herbarium is labelled *Cylindrosporium salicinum* Ellis & Ev. sp. nov. in litt., Sept., 1892. This name was not published because the late Mr. J. B. Ellis on further study concluded that it "was too near *Septoria albaniensis* Thüm." In 1873 Prof. Peck published *Septoria salicina,* on *Salix lucida,* Ann.Rep. N. Y. State Mus. **25**: 87. 1873. *Septoria albaniensis* Thüm., on *Salix lucida* was published in Bot. Gaz., Oct., 1880. Careful comparison of authentic material—types or co-types—of the foregoing failed to reveal a satisfactory means of distinguishing them.

Co-type of *Phleospora Dearnessii* Sacc., on *Salix nigra,* published in 1914, Ann. Myc. **12**: 299, cannot be separated with certainty from the preceding. Dr. Saccardo remarked that this species verges on *Marssonia,* but the sporules favor *Phleospora* and further that it may not be different from *Septoria albaniensis* Thüm. and *S. salicina* Peck, the descriptions of which are inadequate for a decision. In the apparently earlier stages their discolorous pustules bear a resemblance on the surface to pycnidia but finally they become nearly concolorous and are visible as circular depressions or cavities rupturing usually, not always, through the lower cuticle of the leaf.

Fungi Columb. *3872,* incorrectly labeled *Septogloeum salicinum* (Peck) Sacc., has somewhat larger sporules and some of the spots are larger and conspicuously circinated or mottled. The differences, taking a large number of specimens into account, are insufficient for a new form-species. It might, however, pass for a variety, say var. *circinatum.*

The form in Fungi Columb. *3779* and *4387*, both on *Salix Fendlieriana*, incorrectly labeled *Septoria Salicis* West., differs from all the preceding in its larger sporules. It is less distinctly maculate and almost completely epiphyllous. (*Septogloeum Salicis-Fendlerianæ* sp. nov.)

Examination and comparison of all the available material seems to justify the following determinations:

Cylindrosporium salicinum (Peck) Dearness (=*Septoria salicina* Peck on *Salix lucida*. Acervuli mostly hypophyllous, on arid centers of spots; sporules about 38 × 3–3.25 μ, obscurely 1–3 septate. Ellis & Ev. N. Am. Fungi, *2646, 3064, 3369;* Fungi Columb. *284, 2081.*

f. *albaniensis* (Thüm.) on *Salix lucida*. Maculæ less distinct; sporules usually straight about 33 × 2.75–3 μ. Seym. & Earle Ec. Fungi *197;* Fungi Columb. *1346.*

var. **circinatum** var. nov. on *Salix lucida*. Maculæ .5–1.5 cm. mostly circinate or mottled; sporules 40 × 3–3.5 μ. This is Fungi Columb. *3872.*

Septoria Salicis West., as exhibited in Roumeguère's Fungi Gallici *3843*, and *S. salicicola* Sacc., in de Thümen's Myc. Univ. *1993*, have true pycnidia and are quite different from any American species of *Septoria* on willow that I have seen. In both, the spots are small, about 1 mm., the pycnidia nearly black and mostly epiphyllous.

In this connection it may be worth while to report briefly the results of the examination of three other allied form-species on willow leaves. See No. 41.

41. GLOEOSPORIUM SALICIS West. Fungi Columb. *855, 4122*; N. Am. Fungi *2441.*

Supplementary to description in Jour. Myc. **1**: 113. 1885.

Maculae numerous, small, angular, acervuli epiphyllous. Sporules 15–23 × 7.5–10 μ mostly 2-nucleate.

Gloesosporium boreale Ellis & Ev. on *Salix cordata* Fungi Columb. *682*; N. Am. Fungi *3279.*

Supplementary to Proc. Acad. Phila. **1893**: 459. 1893.

Acervuli hypophyllous. Spores issue in cirrhi, simple, 7–12 × 1.5–2 μ.

Septogloeum salicinum (Peck) Sacc.
(*Gloeosporium* Peck). On *Salix sericea.*

Supplementary to the description in Ann. Rep. N. Y. State Mus. **33**: 26. 1883.

The indefinite, "arid," spore-producing parts seem to develop from precedent, dull-purplish areas. Acervuli hypophyllous, irregularly rupturing the cuticle and delivering the spores in yellowish heaps rather than in cirrhi. Sporules grumous, or granular, no nucleate ones observed, 10–50 × 3–6 μ mostly about 45 × 5 μ, continuous or 1.3 septate, mostly 1-septate, the proximal half rounded on the end, 4–6 μ thick, the other half acuminate to a subacute point and curved.

Septogloeum maculans Hark. on *Salix lasiolepis.*

Jour. Myc. **1**: 117. This is quite distinct and seems to be the conidia of a dark, radiating fungus in the interior of the leaf.

42. **Cryptosporium candidum** nom. nov.

A species of *Cryptosporium* on *Abies* was published in *Mycologia* **8**: 107 under the preoccupied name *C. falcatum.* It is hereby changed to *C. candidum.* The name refers to the white flecks of exuded spore-masses on the dark bark of the host which draw attention to the presence and location of the fungus.

43. **Fusoma rubricosa** Dearn. & Barth. sp. nov.

Minute, brown, elongate spots, 1 × .2 mm. indicate the points of infection of the host; red areas extending from these spots become confluent and impart their color to the leaf. Both sides are similarly reddened but the lower side is white-specked with the flake-like colonies of conidia. Conidia hypophyllous, hyaline, shuttle-shaped, 3 septate, 35–45 × 11–15 μ, subsessile or borne on short sporophores, 9–18 × 4–5 μ.

On living leaves of *Calamagrostis scabra* Presl., Glacier National Park, Mont., Aug., 1915, *E. T. Bartholomew.* Type collection, Fungi Columb. *5019.*

44. **Ramularia Clematidis** Dearn. & Barth. sp. nov.

Spots pallid, irregular, mostly bounded by the veinlets, paler when held to the light than the unaffected portions of the leaf, slightly reddened on the under side by the conidia. Hyphae short, on colorless, flattish bases. Conidia hyaline, having a reddish tint in the mass, continuous or 1-septate, 20–30 × 4–7 μ.

On living leaves of *Clematis ligusticifolia* Nutt., Billings, Mont., Aug., 1913, *E. T.* and *E. Bartholomew 5180.* Type collection, Fungi Columb. *5084.*

45. **Ramularia Ranunculi-Lyallii** Dearn. & Barth. sp. nov.

On the upper side of the leaf, small, irregularly-oblong spots mark the diseased parts. These bear on the lower side numerous acervuli of short sporophores supporting subfusoid, hyaline, continuous conidia, 15–22 × 2.5–4 μ; and finally becoming a dense, white mould-like layer. These spots may become confluent and the whole lobe or leaf sered.

On *Ranunculus Lyallii* (Gray) Ryd. Bremerton, Wash., July, 1912, *E. Bartholomew.* Victoria, B. C., April, 1915, *John Macoun.*

46. (?) **Cercosporella Aceris** Dearn. & Barth. sp. nov.

Extensive areas, dark-brown above, reddish-brown below, surrounded as seen when held up to the light by a greenish, translucent border, 1–2 mm. wide. Tufts of hyphae and sporules whitish, numerous, superficial, epiphyllous, consisting of long, slender, straight, hyaline, septate sporules 150–200 × 4 μ, intermixed with thick, short, septate hyalin offshoots from the same base, 15–50 × 6–10 μ.

Destructive to living leaves of *Acer macrophyllum* Ph., Duckabush, Wash., Aug., 1912, *E. Bartholomew 4817.* Type collection, Fungi Columb. *5005.*

47. (?) **Cercosporella Alni** Dearn. & Barth. sp. nov.

Slightly discolored areas sometimes extending over the whole leaf, hardly visible on the lower side unless held up to the light but well marked on the upper side by the numerous, whitish or yellowish tufts of hyphae and spores. These superficial tufts or masses consist of hyaline, straight, 2–5-septate sporules, 270–360 × 5–6 μ, intermixed with hyaline, relatively short offshoots 30–100 × 10–20 μ from the same base of globular or quadrate cells, 9–14 μ. The second form may develop into the first named, long, straight sporules. The oldest masses seem yellowish, waxy tubercles supporting numerous, long, hyaline sporules.

Destructive to living leaves of *Alnus rubra* Boug., Bremerton, Wash., Sept., 1912, *E. Bartholomew 4924.* Type collection,

Fungi Columb. *5006*. This may be only a host variety of the preceding or *vice versa*.

48. **Cercospora Streptopi** Dearn. & Barth. sp. nov.

Spots yellowish, irregularly oblong, 2–5 mm., bounded by the veinlets, becoming confluent and turning brown. Hyphae 15 μ, on pale, later becoming dark, tubercular bases, mostly hypophyllous. Conidia abundant, 20–63 $\times$ 5.5–6 μ, 1–7-septate; they and the fertile hyphae pinkish and imparting to the lower side of the leaf a decidedly pinkish hue.

On living leaves of *Streptopus amplexifolius* (L.) DC., Duckabush River, Wash., Aug., 1912, *E. Bartholomew 4857*. Type collection, Fungi Columb. *5004*.

49. **Helminthosporium repente** Dearn. & Barth. sp. nov.

Extensively creeping and proliferating over the bark,—dark, olive-brown hyphae 5–8 μ thick, cells 6–15 μ long; conidiophores or fertile branches, narrower and paler than the conidia and with longer cells. Conidia sub-oblong, 5–12-septate, dark-brown, nearly opaque throughout, horizontal or ascending, mostly 40–45 $\times$ 8–9 μ when mature, exceptionally reaching 60 μ in length, septa 4–6 μ apart.

On bark of dead *Acer grandidentatum* Nutt., Red Butte Canyon, Utah, June, 1913, *E. Bartholomew 5826*.

50. **Fusarium gleditsiaecolum** Dearn & Barth. sp. nov.

Sporodochia salmon-colored, white below the conidiophorous layer, erumpent through the cuticle, seated on the cortex which assumes a reddish tinge on the surface adjoining the wood. Sporules arcuate, hyaline, 1–3-septate, 30–45 $\times$ 3–4 μ on more or less branched conidiophores forming a layer 30–100 μ in depth.

On dead *Gleditsia triacanthos*, L., Stockton, Kansas, May, 1914, *E. Bartholomew 5554*.

F. scolecoides Sacc. & Ellis, which this resembles, has 5-septate sporules, 70–80 μ in length.

51. **Fusarium Macounii** sp. nov.

Sporodochia gregarious, whitish with carneous tinge, erumpent-superficial, depressed, irregularly circular to elliptic, walled

around by the ruptured epidermis, .3–.5 mm. in diam. Hyphae fasciculate on a pseudo-parenchymatic base; sporophores simple or more frequently branched, 2.5–3 μ thick. Conidia hyaline, straightish, terminal and solitary on the narrow branches of the sporophores, continuous to 3-septate, not constricted, 20–60 $\times$ 5–6.5 μ.

On dead maple bark (*Acer* sp.) Vancouver Island, August, 1916, *John Macoun, 1003*.

The conidia are larger and sporophores narrower than in *Fusarium illosporoides* Sacc., to which it is otherwise similar.

LONDON, ONTARIO, CANADA.

NEW JAPANESE FUNGI

NOTES AND TRANSLATIONS—III

TYÔZABURÔ TANAKA

MASSARIA MORICOLA I. Miyake sp. nov. in Sangyô Shikenjô Hôkoku (Technical report of the Imperial Sericultural Experiment Station), Tôkyô, Japan. **1**[5]: 318, pl. 16, figs. 6, 7, 8. T. 5, xii, Dec. 1916. (Japanese.)

Perithecia thickly scattered, subepidermal, penetrating the epidermis with elongated ostiola, spherical or ellipsoidal, 300–400 μ in diam., 280–372 μ in height, the inside of ostiolum and adjacent area covered by short periphysatic hairs, containing few asci; asci cylindrical or ovoid, short stipitate, 140–200 $\times$ 37–46 μ, paraphysate; ascospores biseriate or irregular, hyaline and unicellular at juvenile stage but quickly developing into 4-celled dark-colored mature spores, the contents of which are first characteristically represented by comparatively large shiny oil globules, soon disappearing and replaced by granular protoplasm scarcely permitting the light to pass through, 52–65 $\times$ 13–17 μ, cylindrical, not constricted at the septum; gelatinous envelope none.

On twigs of *Morus alba* (common).

Type localities: Gifu-ken (prefecture), Kaidzu-gun Kaisai-mura, Mar. 1909, I. Miyake; Fukui-ken (pref.) Ôno-gun and Hida-no-kuni (Gifu prefecture) Mashita-gun, Shimohara-mura, Mar. 1909, K. Hara; Nagano-ken (pref.) Shino-ina-gun, May, 1910, I. Miyake; Tôkyô-fu (pref.) Nakano-chô Jan. 1915, I. Miyake; Tochigi-ken (pref.) Utsunomiya-shi and Fukushima-ken (pref.) Fukushima-shi, Mar. 1915, I. Miyake; Kyôto-fu (pref.) Ayabe-chô, Apr. 1915, I. Miyake.

Illustrations: 3 black and white lithographic figures showing detailed structure of the fungus.

The juvenile acospores very much resemble those belonging to other genera, but close examination of mature spores will show the characteristics of the genus *Massaria*.

MASSARIA JAPONICA I. Miyake sp. nov. in Sangyô Shikenjô Hôkoku (Technical report of the Imperial Sericultural Experiment Station), Tôkyô, Japan. 1^5: 319, pl. 16, figs. 9, 10, 11. T. 5, xii, Dec. 1916. (Japanese.)

Perithecia gregarious, subepidermal, with ostiola erumpent, elliptical, 400–500 μ across and 250–320 μ high; perithecial walls pseudo-parenchymatous, 70–100 μ thick, black, walls and bottom surrounding inner space consisting of nearly colorless and sub-transparent cells; asci cylindrical, 130–160 × 20–25 μ, octosporous, paraphysate; ascospores dark ink-colored, 4-celled, conspicuously constricted at the middle septum, occasionally but not distinguishably so at the other septa, containing one large oil globule in each cell, 30–35 × 9–11 μ; gelatinous envelope none; paraphyses filiform, about 1 μ thick, abundant, exceeding asci in length.

On twigs of *Morus alba* (not common).

Type localities: Gifu-ken (prefecture) Ena-gun Kashimo-mura, Mar. 1909, K. Hara; Iwate-ken (pref.) Hanamaki-chô, Apr. 1915, I. Miyake.

Illustrations: 3 black and white lithographic figures showing detailed structure.

Easily distinguished under the microscope from other related species by having the inner layers of the perithecial walls nearly colorless and sub-transparent.

KEY TO THE FOUR SPECIES OF MASSARIA ABOVE DESCRIBED[1]

(*A*) Ascospores with gelatinous envelope.
  (*a*) Ascospores 3–5, usually 4-septate.....*M. phorcioides.*
  (*b*) Ascospores 3-septate .....*M. Mori.*
(*B*) Ascospores without gelatinous envelope.
  (*a*) Ascospores not constricted at the middle septum.....*M. moricola.*
  (*b*) Ascospores constricted at the middle septum.....*M. japonica.*

Three species of *Massaria* are already known to be parasitic or saprophytic on *Morus alba,* but all can be distinguished in some way from these four new species.

Massaria epileuca B. and C. is characterized by having asco-

[1] For descriptions of *M. phorcioides* and *M. Mori,* see the second article of this series.

In the description of *M. Mori,* the two following lines were unfortunately omitted in the final printing:
ing of black pseudo-parenchymatous tissue; asci cylindric, shortly pedicelled, 140–160 x 40–50 μ, octosporous, paraphysate;

spores with smaller terminal cells; *M. Antoniae* Far., which is related to our *M. phorcioides* by its ascospores having a large number of cells, can be distinguished by 6– (rarely 7–8) celled spores, instead of 4– (rarely 6–7) celled as in the latter species. *Massaria olivaceo-hirta* Cooke is rather doubtful but may differ in the color and form of ascospores.

MYCOSPHAERELLA HORII K. Hara sp. nov. in Nippon Engei Zasshi (Journ. of Hort. Soc. Japan), 29^3: 10, illus. (p. 9, figs. 1–6). T. 6, iii, Mar. 1917. (Japanese.)

Spots irregularly orbicular, about 3–6 mm. across, reddish-brown and frequently changing to gray when mature; margin definite, raised, blackish-brown, punctated with black, minute perithecia; perithecia gregarious or scattered, punctiform, at first immersed then partly erumpent, black, globose or elliptico-globose, 60–100 μ; perithecial walls pseudo-parenchymatous, cells rather indefinite, about 3–8 μ across, blackish-brown, carbonaceous; ostiola slightly raised, warty or short papillate with openings about 5–7 μ across; asci caespitose, clavate-cylindrical or oblong-ovoid, obtuse, stipitate, octosporous, 30–40 $\times$ 7–10 μ; ascospores biseriate or inordinate, oblong-ovoid, uniseptate, not usually constricted; terminal cell slightly wider and much rounded at the apex; basal cell rather acuminate toward the base though not pointed at the end and nearly as round as the apex, colorless and hyaline, 9–12.5 $\times$ 2.5–3 μ.

On leaves of *Citrus*.

Type locality: Hamana-mura, Inasa-gun, Shidzuoka-ken, Japan, June, 1914, Katarô, Shimidzu.

Japanese name of disease: Kasshoku Ko-maruboshibyô (small, brown, round-spot disease).

Illustrations: 6 text figures showing detailed structure of the fungus.

Dr. Shôtarô Hori, in Engei no Tomo (Friend of Horticulture) 9^7: 40–45, Tôkyô, July, 1913, considers the cause of this disease to be *Phyllosticta curvarispora* Hori sp. nov. As no description of the fungus was given there or elsewhere, there is no way to determine whether this imperfect fungus is a form of *Mycosphaerella Horii*, but the existence of such relationship is suggested as very possible since many species of these two genera are known to be related. The fungus mostly attacks navel and Unshû (Satsuma) oranges, according to Dr. Hori.

Phyllosticta citricola Hori ex K. Hara in Nippon Engei Zasshi (Journ. of Hort. Soc. Japan), **29**[3]: 11, illus. (p. 9, figs. 7–9). T. 6, iii, Mar. 1917. (Japanese.) First published by Hori as *Phyllosticta citricola* Hori sp. nov. in Engei no Tome (Friend of Horticulture), **9**[7]: 627, T. 2, vii, July, 1913, but with no description of the fungus, symptoms alone being given.

Pycnidia punctiform, black, first immersed then slightly raised and disclosing the upper end, gregarious or scattered, globose or depressed-globose, 100–130 μ in diam.; perithecial walls membranaceous, cells about 4–7 μ, dark-brown, carbonaceous; ostiola terminal, papillate or even; openings round, about 10–12 μ across; pycnospores globose, ovoid, or short-ellipsoid, 1-nucleate at the middle and very much granulated all over, colorless and hyaline, 6–11 $\times$ 6–9 μ; the spore mass does not seem to form the thread-like protrusion covered with mucilaginous matter.

On leaves of *Citrus*.

Type locality: Toyoda-mura, Abe-gun, Shidzuoka-ken, coll. by Okada, July 6, 1914.

Japanese name of disease: Kasshoku Ô-maruboshibyô (large, brown, round-spot disease).

This disease is reported to have caused great injury to Natsudaidai (Japanese summer orange) in the province of Toyoda-gun, Hiroshima-ken, and also in Abe-gun, Shidzuoka-ken. Hori reported it as also attacking the Unshû (Satsuma) orange.

BUREAU OF PLANT INDUSTRY,
WASHINGTON, D. C.

NOTES AND BRIEF ARTICLES

Professor W. C. Coker, of the University of North Carolina, continued his studies of the Clavariaceae in the herbarium of the Garden during August.

Mr. L. O. Overholts, of State College, Pennsylvania, was given a research scholarship for August 15 to September 15, to complete his study of the genus *Pholiota* for *North American Flora.*

Mr. Percy Wilson recently collected a specimen of *Tyromyces Spragueі* on the base of a living larch tree growing in the grounds of the New York Botanical Garden. This fungus occurs abundantly on chestnut and oak throughout the northeastern United States, but has never before been reported on a conifer. Mr. Weir found *Grifola Berkeleyi,* an oak-loving species, attacking the roots of larch in Idaho. Possibly the larch is more deciduous than has been supposed!

M. Paul Hariot, author of various works on fungi and algae, and for many years in charge of the cryptogamic collections at the Muséum d'Histoire Naturelle of Paris, died on July 5, from diabetic complications. The broad-minded liberality and tireless patience with which M. Hariot always placed the treasures of his department of the museum at the service of the scientific men of the world will long be held in grateful remembrance by American botanists.

In a recent number of the *Botanical Gazette,* Harry M. Fitzpatrick discussed the development of the ascocarp of *Rhizina undulata.* The Helvellaceae have formerly been separated from the other orders of the discomycetes by the fact that the fruit body is open from the first. The erroneousness of this distinction has been abundantly established by various workers. The

genus *Rhizina* shows no evidence of an enclosing veil at any stage in its development, a fact which has been demonstrated by Fitzpatrick. The sexual apparatus is to be described in a later paper.

A specimen of *Schizophyllus alneus* (L.) Schroet., usually known as *S. commune,* was found on September 3, 1917, by Dr. G. Clyde Fisher, at Douglaston, Long Island, growing on a rotten apple. Several sporophores had emerged from the substratum at three or four points and had just about reached maturity when I saw the specimen. This would seem to indicate that spore germination and development of fruit-bodies may proceed quite rapidly in this species.

"The Cultivation and Diseases of the Sweet Pea" is the title of a book recently published by J. J. Taubenhaus, of the Texas Experiment Station, with an introduction by Mel Cook, of Rutgers College, New Jersey. The book is based largely on the practical experience of the writer and is written in a popular manner so as to appeal to the practical grower. About half of the book is devoted to the culture of the sweet pea and the remainder to the diseases which threaten to discourage the cultivation of this ornamental plant. The various insect and fungous pests are considered in detail with suggestions for their control. The book consists of xx + 232 pages with 46 figures and is printed in large type so as to be easily legible.

A disease of the hemlock tree due to *Fomitiporia tsugina* Murrill was discovered by Mr. Percy Wilson at East Hebron, New Hampshire, in August, 1905. In July, 1917, Mr. Wilson revisited the type locality and gathered specimens from the trunk of the same tree, which was found to be dead and prostrate on the ground. These latter specimens were over an inch thick and broadly effused over the trunk. Living hemlocks recently examined by Mr. Wilson near Bristol, New Hampshire, were also found to be attacked by this fungus, which is known to occur in New Hampshire and New York, always confined to the hemlock. The disease is probably important and should be further investigated both by foresters and mycologists.

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